

# Authors

## William F. Beausoleil

*System Products Division, Poughkeepsie, New York*

Mr. Beausoleil has begun a five-year appointment as an IBM Fellow, a position in which he is free to pursue projects of his own choosing. He is currently working at the Poughkeepsie laboratory on advanced pattern recognition systems. Since joining IBM at Owego, New York in 1956 to work on designing the computer for the Titan II missile, he has also contributed to the I/O architecture for Systems/360 and /370, and, while at the laboratory in La Gaude, France, worked on developing the IBM 2750 Voice and Data Switching System. Mr. Beausoleil received his B.S. in Electrical Engineering from the University of Connecticut in 1956. He is a member of the IEEE.

## Davis T. Brown

*System Development Division, Poughkeepsie, New York*

Mr. Brown joined IBM at Poughkeepsie in 1959. Until 1966 he worked on the enhancement of computer systems reliability through the use of error correcting codes and other redundancy techniques. Since 1966 he has worked on systems performance analysis, using queueing theory and simulation to evaluate new computing systems concepts. He holds B.S. and M.S. degrees in Electrical Engineering, 1959, from the Massachusetts Institute of Technology. He is a member of Eta Kappa Nu, Sigma Xi, and the IEEE.

## Augustin A. Dubrulle

*Data Processing Division, Palo Alto, California*

Mr. Dubrulle is a numerical analyst in a scientific software development group of the Data Processing Division in Palo Alto. His education includes a "Licence de Mathematiques" and a "Licence de Physique" from the University of Lille, France, 1959. He joined IBM France in 1962 and worked at the IBM Scientific Data Center in Paris until 1967 as a numerical analyst and a consultant in the field of numerical mathematics. From 1967 to 1971 he was assigned to Industry Development-Scientific Applications and participated in the design and development of mathematics program libraries and also specialized in the field of numerical linear algebra.

## Pierre Michaud

*World Trade Corporation, Scientific Center, Paris, France*

Dr. Michaud is an Applied Mathematician specializing in mathematical programming in an advanced operations research group at the Scientific Center in Paris. He joined IBM in 1967 to work in an Industry Development Scientific group at the Data Processing Division in White Plains, New York. His education includes a B.S. in 1964, an M.S. in 1965 and a Ph.D. in Applied Mathematics, all from the University of Paris. During preparation of his thesis, he worked at the Electricité de France in 1966 and 1967.

## Frank R. Moore

*System Products Division, Poughkeepsie, New York*

Dr. Moore is an Advisory Engineer with the Advanced Systems group in Poughkeepsie. He joined IBM in 1963 after receiving a B.S.E.E. from Lehigh University. While on educational leave from IBM he obtained an M.S. (E.E.) and a Ph. D. degree from Syracuse University in 1967 and 1969 respectively. At Syracuse University, Dr. Moore was employed as an Instructor and a Research Engineer. Since returning from educational leave, he has been involved in performance prediction and computer architecture work. Dr. Moore is a member of the IEEE, Association for Computing Machinery, American Association for the Advancement of Science, Tau Beta Pi, Eta Kappa Nu, Pi Mu Epsilon and Sigma Xi.

## Henry G. Peters

*Federal Systems Division, Owego, New York*

Mr. Peters is a Senior Lab Specialist in the Quality Engineering Laboratory at Owego. He is currently involved in the development of chemical processes and materials and in efforts to reduce polluting effluents from the plant. He graduated from Paul-Smiths Community College in 1959 and is a licensed X-ray technician. He has also attended Broome Community College and Harpur College, both in Binghamton, New York, taking courses leading to a B. A. in chemistry. Mr. Peters joined IBM in 1964. Prior to that, he was a chemical technician at the General Aniline and Film Corporation, where he worked in solution chemistry and emulsion technology. He is a member of the American Registry of X-ray Technicians.

## Byron E. Phelps

*System Development Division, Poughkeepsie, New York*

Mr. Phelps is a Senior Engineer in Systems Architecture at the Poughkeepsie Laboratory. He received a B.S. in Electrical Engineering from Union College in 1935 and joined IBM in July 1935 as a Student Engineer. In 1940 he started applying electronic circuits to tabulating machines. From 1941 to 1942 he designed and built the first complete operating decimal electronic calculator, a 12-digit multiplier with punched-card input and output. In 1945-46 he was part of the team that developed the IBM 603, the first production electronic calculator. In 1946 he headed the development of the arithmetic section of the Selective Sequence Electronic Calculator (SSEC), the first operating computer to embody the basic concepts of the stored program, and was also assistant manager of the group which developed the IBM 604. In 1949 he invented the NRZI tape recording system. At that time, he headed a magnetic tape study group which, by 1952, had developed the Tape Processing Machine (TPM), the forerunner of the IBM 702. After serving as Manager of Component Development for several years, he has worked in various consultant and staff positions. Mr. Phelps is a senior member of the IEEE.

## Richard M. Poliak

*System Products Division, Endicott, New York*

Mr. Poliak is a Senior Associate Engineer in the Memory Packaging Department of the Components Division Laboratory at Endicott. His educational background includes a B.S. in Chemistry from the University of Pittsburgh and graduate studies in Systems Engineering at the State University of New York, Binghamton. Mr. Poliak joined IBM in 1965 after working as a metallurgist for U.S. Steel at the Monroeville Research Center.

**Philipp W. H. Schuessler**

*Federal System Division, Owego, New York*

Mr. Schuessler is a Staff Chemist in the Materials Development and Analysis Department of the Electronics Systems Center at Owego. He received an A.A.S. degree from Hudson Valley Community College in 1961 and B.S. and M.S. degrees in Chemistry from Rochester Institute of Technology in 1963 and 1966 respectively. He joined IBM in 1963 as a Junior Analytical Chemist and took an educational leave from 1964 to 1966. He is currently involved in the development of pollution free manufacturing processes and materials. His work also includes the failure analysis of systems which have been adversely effected by normal and abnormal environmental conditions. He is a member of the American Chemical Society and the Society for Applied Spectroscopy. In 1971, he was selected as one of the Outstanding Young Men of America.

**Hajimi Seki**

*Research Division, San Jose, California*

Dr. Seki is the manager of photophysics and chemistry in the Inorganic Materials Science Department at the laboratory in San Jose. He joined IBM in 1961 at the Thomas J. Watson Research Center in Yorktown Heights. He received a B.S. from Brown University in 1964, and M.S. and Ph.D. degrees in Physics in 1956 and 1961 from the University of Pennsylvania. Dr. Seki is a member of the American Physical Society, the Physical Society of Japan, the Electrostatics Society of America and the American Association for the Advancement of Science.

**Richard T. Sha**

*Thomas J. Watson Research Center, Yorktown Heights, New York*

Dr. Sha is a Staff Member at the Research Center in Yorktown Heights where he has worked since joining IBM in 1968. He graduated from Taipei Institute of Technology in 1956; received an M.S.E.E. from the University of Idaho in 1959 and a Ph.D. in Electrical Engineering from the University of Pittsburgh in 1968. He worked as a Research Engineer at the Perkin Elmer Corporation from 1960 to 1961, was a Development Engineer at Hewlett-Packard Company from 1961 to 1962 and a Project Engineer in Research and Engineering Department of Western Union Telegraph Company from 1962 to 1964. Dr. Sha is a member of Sigma Xi and the IEEE.

**Donal T. Tang**

*Thomas J. Watson Research Center, Yorktown Heights, New York*

Dr. Tang works in the Computer Sciences Department at the Research Center on the evaluation and optimization of computer/communication systems. He received his B.E. in Electrical Engineering at the Taiwan University in 1953 and his Ph.D. in Electrical Engineering at the University of Illinois in 1960. A research staff member since 1960, his activities include error control coding for communication systems and magnetic recording systems, and communication network analysis and design. He was a Visiting Professor of Electrical Engineering at the National Taiwan University during the 1965-1966 school year. He is a member of Eta Kappa Nu, Sigma Xi and the IEEE.

**Gottfried Ungerboeck**

*Zurich Research Laboratory, Ruschlikon Switzerland*

Dr. Ungerboeck is a member of a communications group at the Research Division Laboratory in Zurich. He joined IBM Research in 1967. His education includes a Dipl. Ing. degree from the Technical University of Vienna, 1964, and a Ph.D. from the Swiss Federal Institute of Technology, Zurich, 1970. Initially he was engaged in a speech-processing project. He then worked in the area of data transmission, where he was concerned with various topics related to equalization and detection theory. He is currently investigating problems in switching.

**Jan A. van der Pool**

*IBM Nederland, Amsterdam, Netherlands*

Mr. van der Pool is Scientific Relations Manager of IBM Nederland in Amsterdam, The Netherlands. He has been with IBM since 1957. His education includes a Ph.D. in Mathematics from the University of Utrecht in The Netherlands in 1947. He was a teacher in the Dutch Secondary School System until 1948. He worked in the Actuarial Department of the National Levensverzekering-Bank in The Netherlands from 1948 until joining IBM. He was among the first in Europe to use computers for actuarial computations. He was Manager of Applied Science, Advisory Systems Engineer, and Scientific Marketing Manager in IBM Nederland. The work described in the paper was done during an assignment with IBM Research in San Jose from 1970 until 1972 where he joined the Department of Information Sciences. He is a member of the Dutch Mathematical Society, Computer Society, Society for Operations Research and the Association for Computing Machinery.

**William T. Weeks**

*System Products Division, E. Fishkill, New York*

Dr. Weeks is currently working on problems in network analysis at the laboratory in East Fishkill. He joined IBM in 1960 at the laboratory in Poughkeepsie, New York, and since then has contributed to a variety of projects in scientific computation and memory development. He received a B.A. in Physics from Williams College, Williamstown, Massachusetts in 1954 and M.S. and Ph.D. degrees in Physics from the University of Michigan, Ann Arbor, Michigan in 1955 and 1960 respectively. Dr. Weeks is a member of the American Physical Society, RESA, and Phi Beta Kappa.

**Gerhardt Weiser**

*University of Marburg, Marburg, Germany*

Dr. Weiser is a Wissenschaftlicher Assistant in the Physics Department at the University of Marburg. He spent the academic year, 1971-1972, as an IBM World Trade Fellow at the San Jose Research Laboratory, where he was involved in the investigation of optical properties of organic photoconductors. He received his Diplom from the University of Karlsruhe in 1963 and a Ph. D. from the University of Marburg in 1969. He has generally been active in the field of modulated solid state spectroscopy.